

# PATENT COOPERATION TREATY

To:

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# PCT

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

(PCT Rule 43bis.1)

Date of mailing (day/month/year)	29 July 2005 (29.07.2005)
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Applicant's or agent's file reference  
**opp040530kr**

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
**PCT/KR 2004/003408**

International filing date (day/month/year)  
**22 December 2004 (22.12.2004)**

Priority Date (day/month/year)  
**22 December 2003 (22.12.2003)**

International Patent Classification (IPC) or both national classification and IPC  
**H04Q 7/36, H04L27/26**

Applicant

**ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE**

1. This opinion contains indications relating to the following items:

- ☒ Cont. No. I Basis of the opinion
- ☐ Cont. No. II Priority
- ☐ Cont. No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Cont. No. IV Lack of unity of invention
- ☒ Cont. No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Cont. No. VI Certain documents cited
- ☒ Cont. No. VII Certain defects in the international application
- ☒ Cont. No. VIII Certain observations on the international application

## 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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10/584437  
IAP2 Rec'd PCT/PTO 22 JUN 2006

International application No.  
PCT/KR 2004/003408

**Continuation No. I**

**Basis of the opinion**

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed.

**Continuation No. V**

**Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Claims 3-14	YES
	Claims 1, 2	NO
Inventive step (IS)	Claims 7-11	YES
	Claims 1-6, 12-14	NO
Industrial applicability (IA)	Claims 1-14	YES
	Claims ----	NO

**2. Citations and explanations:**

The following documents have been cited:

D1: WO 2002/049306 A2  
D2: EP 1 056 304 A2  
D3: WO 1998/052374 A2

Document D1, which is considered to represent the closest prior art, discloses in line with the essential features of independent claims 1 and 2 a method for constituting a layered cell in an OFDMA mobile communication system (see *paragraph [0002]*) wherein the method comprising:

- (a) dividing L carriers having orthogonality into M sub-channels  
- see *Figs. 1A, 2*
- (b) dividing the carriers into N groups each having the M sub-channels  
- see *Fig. 6*

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- (c) grouping the N groups by an arbitrary integer into K classes  
- see *paragraphs [0095], [0096] or [0099]*

- (d) constituting a plurality of layered cells corresponding to the K classes  
- see *Fig. 8, page 21, lines 21-24 or page 25, lines 28-30*

With respect to document D1 the essential steps of independent claims 1 and 2 lack novelty and the additional features introduced in dependent claims 3-5 are at least not inventive.

More specifically, document D1 discloses the two relevant principles of allocating different groups of sub-channels to sector layers (*see claims 25-28*) and of allocating different groups of sub-channels to close/distant subscribers or fixed/mobile subscribers (*see paragraphs [106] and [107]*) thereby constituting different cell layers.

Document D1 does not directly provide a configuration of a layered cell in an OFDM mobile communication system whereby a single cell layer serves the entire cell area (*i.e. umbrella cell*) and a plurality of sector layers serve only a small portion (*i.e. microcell*) of the cell. However, mobile communication systems employing such a layered cell configuration employing a single umbrella cell layer serving the entire cell area and a plurality of microcells serving only a small portion of the service area are generally known in the art in order to increase cell traffic capacity (*see e.g. documents D2 or D3*).

Furthermore, the well known principles of employing adaptive modulation and coding for high-speed data transmission according to the perceived channel condition and the selected data rate are in principal disclosed in document D1 (*see paragraphs [0050]-[0053]*) and as its application to a generally known mobile communication system employing a single umbrella cell layer and a plurality of microcells is considered to be straightforward and obvious to thereby arrive at an OFDM mobile communication system having a single cell layer serving the entire cell area and a plurality of sector layers serving only a small portion, according to the additional features introduced in dependent claims 6 and 14. Therefore, the additional features introduced in dependent claims 6 and 14 do not involve an inventive step in view of document D1.

Furthermore, document D2 discloses a narrow beam traffic channel assignment method and apparatus, whereby the mobile communication system comprises a single umbrella layer for serving the control channel and a small number of traffic channels in the entire cell area and a plurality of sector layers for serving a considerably larger number of traffic channels in only a small portion of the said cell area (*see Fig. 5, and paragraphs [0017] and [0022]*). According to document D2, the traffic channels of the umbrella layer are used for providing communication as long as the communication can be handed down to one of the sector layers.

Document D3 similarly reveals the principle of using an umbrella cell for mobile resources having a high movement speed and of using the microcells for mobile resources having a low movement speed (*see Fig. 2 and page 7, line 28 – page 8, line 2*) in order to reduce the amount of handover events.

In view of the foregoing explanations, the subject matter of dependent claims 12 and 13 in combination with the features of the claims to which they refer does not involve an inventive step, when combining the teaching of documents D1 and D2 or D1 and D3.

In conclusion the subject matter of independent claims 1 and 2 is not new in view of document D1 and the subject matter of dependent claims 3 to 6 and 12 to 14 do not contain any additional features which in combination with the features of any claims to which they refer, involve an inventive step for the reason that the subject matter of said claims is either in principle disclosed or suggested by documents D1 to D3 or represent further design details which are generally known to the skilled artisan.

However, the cited documents D1 to D3 neither disclose alone nor suggest in combination any details of how the different classes of groups of sub-channels are allocated to the sector layers and to the cell layer. Therefore, it is considered that the additional features introduced

in dependent claims 7 to 11 in combination with the features of the claims to which they refer are new and inventive as well.

Industrial capability is given.

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**Continuation No. VII:**

**Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

In order to meet the requirements of Rule 6.3 (b) PCT, whenever appropriate, each independent claim should be clearly delimited in relation to the closest prior art (for example D1) using the two-part form.

In order to meet the requirements of Rule 5.1 (a)(ii) PCT, documents D1 to D3, which disclose prior art that is relevant to the present invention, should be cited in the description and the said relevant prior art should be briefly outlined.

The description on paragraph [10] contains a reference to a PCT Application. Said reference should be amended to indicate the corresponding International Publication Number, i.e. WO 2003/001696 A2.

Reference signs in parentheses should be inserted in the claims to increase their intelligibility. This applies to both the preamble and the characterizing portion (see Rule 6.2 (b) PCT).

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**Continuation No. VIII:**

**Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Independent claim 2 should be deleted as it redefines the scope of independent claim 1 using exactly the same words.

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Dependent claim 3 should either be deleted or amended as the formulation "...the respective K classes include the same or a different number of groups..." does not clearly impose any restriction on the number of groups being contained in the classes.

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Dependent claim 13 does not clearly define the criteria according to which it is determined that the priority is either low or high.

The applicant is kindly informed, that, occasionally, throughout the description and the claims some words appearing at the end of a line are truncated and wrapped over to the beginning of the following line, see for instance the last word in the third line of paragraph [2] of the description and the first line of claim 5.

When amending the application the applicant should be aware that the claims in the various categories are linked by a single general inventive concept and to avoid giving raise to further objections by inadvertent addition of subject matter.